AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. **(Currently amended)** A method for identifying an agent capable of enhancing longevity, comprising:

contacting an organism having altered activity or expression of a ~~deregulated~~ cholinergic pathway molecule with a test agent, wherein ~~increased lifespan is associated with~~ said ~~deregulated~~ altered activity or expression of the cholinergic pathway molecule leads to increased lifespan;

assaying for the ability of the test agent to increase the lifespan of the organism as compared to a suitable control,

selecting an agent that increases the lifespan,

to thereby identify an agent capable of enhancing longevity.

2. **(Currently amended)** The method of claim 1, wherein said organism further has altered activity or expression of an ~~a deregulated~~ insulin signaling pathway molecule, wherein ~~said increased lifespan is associated with~~ said altered activity or expression of the ~~deregulated~~ cholinergic pathway molecule or said altered activity or expression of the ~~deregulated~~ insulin signaling pathway molecule leads to increased lifespan.

3. **(Canceled)**

4. **(Currently amended)** The method of claim 1 or 2, wherein said organism has altered activity or expression of a ~~deregulated~~ cholinergic pathway molecule selected from the group consisting of a muscarinic receptor, EGL-30 and EGL-8, or a mammalian orthologue of said signaling pathway molecule.

5-6. **(Canceled)**

7. **(Currently amended)** The method of claim 1 or 2, wherein said organism has altered activity or expression of a ~~deregulated~~ cholinergic pathway molecule which is downstream of diacylglycerol (DAG) in ~~a~~ said cholinergic pathway.

8. **(Withdrawn)** The method of claim 7, wherein said organism has a deregulated neurotransmitter signaling pathway molecule selected from the group consisting of UNC-13, PKC, UNC-18, UNC-64, SNAP-25, synaptobrevin, UNC-31, or a mammalian orthologue of said signaling pathway molecule.

9. **(Currently amended)** The method of claim 2, wherein said organism has altered activity or expression of an ~~deregulated~~ insulin signaling pathway molecule selected from the group consisting of DAF-2, AAP-1, IRS, AGE-1, PDK-1, AKT-1, AKT-2 and DAF-18, or a mammalian orthologue of said signaling pathway molecule.

10-13. **(Canceled)**

14. **(Currently amended)** A method for identifying an agent capable of enhancing longevity, comprising:

contacting an organism with a test agent, said organism having a cholinergic pathway;

assaying for the ability of the test agent to inhibit the cholinergic pathway by monitoring the effect of the test agent on one or more of the expression, intracellular level, extracellular level, activity, post-translational modification, interaction[,] or cellular localization~~, or synaptic release~~ of an indicator of said cholinergic pathway as compared to a suitable control, wherein the indicator of said cholinergic pathway is selected from the group consisting of muscarinic receptor, EGL-30, EGL-8, RIC-8, DAG, SNARE complex and UNC-13, or a mammalian orthologue thereof; and

selecting an agent that inhibits the cholinergic pathway;

to thereby identify an agent capable of enhancing longevity.

15. **(Currently amended)** A method for identifying an agent capable of enhancing longevity, comprising:

contacting an organism with a test agent, said organism having a cholinergic pathway and an insulin signaling pathway;

assaying for the ability of the test agent to inhibit the cholinergic pathway and insulin signaling pathway by:

(i) monitoring the effect of the test agent on one or more of the expression, intracellular level, extracellular level, activity, post-translational modification, interaction[,] or cellular localization~~, or synaptic release~~ of at least one indicator of said cholinergic pathway, wherein the indicator of said cholinergic pathway is selected from the group consisting of muscarinic receptor, EGL-30, EGL-8, RIC-8, DAG, SNARE complex and UNC-13, or a mammalian orthologue thereof; and

(ii) monitoring the effect of the test agent on one or more of the expression, intracellular level, extracellular level, activity, post-translational modification, interaction, cellular localization, or synaptic release of at least one indicator of said insulin signaling pathway;

and selecting an agent that inhibits the cholinergic pathway and insulin signaling pathway;

to thereby identify an agent capable of enhancing longevity.

16. **(Currently amended)** The method of claim ~~14 or~~ 15, wherein the indicator of said insulin signaling pathway is an insulin signaling pathway molecule or a reporter of said molecule.

17. **(Original)** The method of claim 16, wherein the agent is identified based on its ability to alter expression of said indicator.

18. **(Original)** The method of claim 16, wherein the agent is identified based on its ability to alter an intracellular or extracellular level of said indicator.

19. **(Original)** The method of claim 16, wherein the agent is identified based on its ability to alter an activity of said indicator.

20. **(Original)** The method of claim 16, wherein the agent is identified based on its ability to alter the cellular localization of said indicator.

21. **(Original)** The method of any one of claims 1, 2, 14 and 15, wherein the organism is a nematode.

22. **(Original)** The method of claim 21, wherein the nematode is *C. elegans*.

23. **(Original)** The method of claim 21, wherein the nematode is a parasitic nematode.

24. **(Currently amended)** A method for identifying an agent capable of enhancing longevity, comprising:

contacting a cell with a test agent, said cell having a cholinergic pathway;

assaying for the ability of the test agent to inhibit the cholinergic pathway by monitoring the effect of the test agent on one or more of the expression, intracellular level, extracellular level, activity, post-translational modification, interaction[,] or cellular localization~~, or synaptic release~~ of an indicator of said cholinergic pathway, wherein the indicator of said cholinergic pathway is selected from the group consisting of muscarinic receptor, EGL-30, EGL-8, RIC-8, DAG, SNARE complex and UNC-13, or a mammalian orthologue thereof; and

selecting an agent that inhibits the cholinergic pathway;

to thereby identify an agent capable of enhancing longevity.

25. **(Currently amended)** A method for identifying an agent capable of enhancing longevity, comprising:

contacting a cell with a test agent, said cell having a cholinergic pathway and an insulin signaling pathway;

assaying for the ability of the test agent to inhibit the cholinergic pathway and insulin signaling pathway by:

(i) monitoring the effect of the test agent on one or more of the expression, intracellular level, extracellular level, activity, post-translational modification, interaction[,] or cellular localization~~, or synaptic release~~ of an indicator of said cholinergic pathway, wherein the indicator of said cholinergic pathway is selected from the group consisting of muscarinic

receptor, EGL-30, EGL-8, RIC-8, DAG, SNARE complex and UNC-13, or a mammalian orthologue thereof;

(ii) and monitoring the effect of the test agent on one or more of the expression, intracellular level, extracellular level, activity, post-translational modification, interaction, cellular localization, or synaptic release of at least one indicator of said insulin signaling pathway; and

selecting an agent that inhibits the cholinergic pathway and insulin signaling pathway;

to thereby identify an agent capable of enhancing longevity.

26. **(Currently amended)** A method for identifying an agent capable of enhancing longevity, comprising:

contacting a cell population with a test agent, said population comprising a cell having a cholinergic pathway and a cell having an insulin signaling pathway;

assaying for the ability of the test agent to inhibit the cholinergic pathway and insulin signaling pathway by:

(i) monitoring the effect of the test agent on one or more of the expression, intracellular level, extracellular level, activity, post-translational modification, interaction[,] or cellular localization~~, or synaptic release~~ of an indicator of said cholinergic pathway, wherein the indicator of said cholinergic pathway is selected from the group consisting of muscarinic receptor, EGL-30, EGL-8, RIC-8, DAG, SNARE complex and UNC-13, or a mammalian orthologue thereof;

(ii) and monitoring the effect of the test agent on one or more of the expression, intracellular level, extracellular level, activity, post-translational modification, interaction, cellular localization, or synaptic release of at least one indicator of said insulin signaling pathway; and

selecting an agent that inhibits the cholinergic pathway and insulin signaling pathway;

to thereby identify an agent capable of enhancing longevity.

27-32. **(Canceled)**

33. **(Currently amended)** The method of any one of claims 24-26, wherein the indicator of said insulin signaling pathway is an insulin signaling pathway molecule or a reporter of said molecule.

34. **(Currently amended)** The method of ~~claim 33~~ any one of claims 24-26, wherein the agent is identified based on its ability to alter expression of said indicator.

35. **(Currently amended)** The method of ~~claim 33~~ any one of claims 24-26, wherein the agent is identified based on its ability to alter an intracellular or extracellular level of said indicator.

36. **(Currently amended)** The method of ~~claim 33~~ any one of claims 24-26, wherein the agent is identified based on its ability to alter an activity of said indicator.

37. **(Currently amended)** The method of ~~claim 33~~ any one of claims 24-26, wherein the agent is identified based on its ability to alter the cellular localization of said indicator.

38. **(Original)** The method of any one of claims 24-26, wherein the cells are mammalian cells.

39. **(Original)** The method of any one of claims 24-26, wherein the cells are human cells.

40. **(Original)** The method of any one of claims 24-26, wherein the cells are derived from a nematode.

41. **(Original)** The method of claim 26, wherein the cell population comprises presynaptic cells and postsynaptic cells.

42. **(Original)** The method of claim 41, wherein the presynaptic cells are nerve cells.

43. **(Original)** The method of claim 41, wherein the postsynaptic cells are nerve cells.

44. **(Original)** The method of claim 41, wherein the postsynaptic cells are muscle cells.

45. **(Currently amended)** A method for identifying an agent capable of enhancing longevity, comprising:

contacting ~~an~~ cell-free assay composition with a test agent in vitro, wherein said cell-fee assay composition comprises a cholinergic pathway molecule selected from the group consisting of EGL-30, EGL-3 and RIC-8, or a mammalian orthologue of said cholinergic pathway molecule;

assaying for the ability of the test agent to affect the activity or expression of said cholinergic pathway molecule; and

selecting an agent that inhibits the activity or expression of said cholinergic pathway molecule;

to thereby identify an agent capable of enhancing longevity.

46-47. **(Canceled)**

48. **(Original)** The method of claim 45, wherein said assay composition is a cell-free extract.

49. **(Withdrawn)** A novel agent identified according to the method of any one of claims 1, 2, 14, 15, 24, 25, 26 and 45.

50. **(Withdrawn)** A pharmaceutical composition comprising the agent of claim 49.

51. **(Withdrawn)** A method of enhancing longevity in a subject, comprising:

administering to a subject in need of enhanced longevity a pharmacologically effective dose of an agent that modulates a neurotransmitter signaling pathway molecule;

wherein modulation of said neurotransmitter signaling pathway molecule in said subject enhances longevity.

52. **(Withdrawn)** The method of claim 51, wherein the agent modulates expression or activity of said neurotransmitter signaling pathway molecule.

53. **(Withdrawn)** The method of claim 51, further comprising administering a pharmacologically effective dose of an agent that inhibits an insulin signaling pathway molecule.

54. **(Withdrawn)** The method of any one of claims 51-53, wherein said subject is an aging or aged subject.

55. **(Withdrawn)** The method of any one of claims 51-53, wherein said subject exhibits at least one symptom of premature aging.

56. **(Withdrawn)** The method of any one of claims 51-53, wherein said subject has an aging-associated disorder.